

Inter-hemispheric Coupling during Recent North Polar Summer Periods as Predicted by MaCWAVE/MIDAS Rocket Data and Traced by TIMED/SABER Measurements

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In July, 2002, the MaCWAVE-MIDAS Rocket Program was launched from Andøya Rocket Range (ARR) in Norway. Data from these flights demonstrated that the polar summer mesosphere during this period was unusual, at least above ARR. Theoretical studies have since been published that imply that the abnormal characteristics of this polar summer were generated by dynamical processes occurring in the southern polar winter hemisphere. We have used data from the SABER instrument aboard the NASA TIMED Satellite to study these characteristics and compare them with the features observed in the ensuing eight years. For background, the TIMED Satellite was launched on December 7, 2001 to study the dynamics and energy of the mesosphere and lower thermosphere. The SABER instrument is a limb scanning infrared radiometer designed to measure temperature of the region as well as a large number of minor constituents. In this study, we review the MaCWAVE rocket results. Next, we investigate the temperature characteristics of the polar mesosphere as a function of spatial and temporal considerations. We have used the most recent SABER dataset (1.07). Weekly averages are used to make comparisons between the winter and summer hemispheres. Furthermore, the data analysis agrees with recent theoretical studies showing that this behavior is a result of anomalous dynamical events in the southern hemisphere. The findings discussed here clearly show the value of scientific rocket flights used in a discovery mode.